

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DOUGLAS N. MASHBURN

Appeal No. 1998-1068
Application No. 08/472,833¹

ON BRIEF

Before KIMLIN, WALTZ, and TIERNEY, Administrative Patent Judges.

TIERNEY, Administrative Patent Judge.

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 19 and 29-34. We reverse the examiner's rejection.

¹Application for patent filed on June 7, 1995. According to appellant, this application is a divisional application of U.S. Application Serial No. 08/278,212 which was filed on July 21, 1994.

The Invention

The invention relates to a method for forming thin films in which a deposition or material addition environment is separate from a film crystallization or growth environment. (Specification, p. 1, lines 2-8). By separating the environments each process can be individually optimized. (Specification, p. 4, lines 13-15). A copy of the claims under appeal is set forth in the appendix to the Appellant's Brief. Independent claim 19 is illustrative of the invention and reads as follows:

19. A method for forming thin films comprising the steps of:

containing a target material in a first container having an interior environment maintained at a first temperature and pressure;

containing a substrate in a second container having an interior environment maintained at a second temperature and pressure; and

periodically exposing the substrate to the environment of the first container while simultaneously exposing the target to a laser beam of sufficient energy to form an ablation plume in the first container that extends into the second chamber to thereby deposit material from the plume onto the substrate.

We note that claim 19 recites "extends into the second chamber." While it is clear that the language "the second **chamber**" refers to the "second **container**," appellant may find it advisable to rewrite the claim such that the language of the claim is internally consistent.

The References

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Behn *et al.* ("Behn") 4,508,049 Apr. 2, 1985

Schultz *et al.*, "Preparation and Characterization of Pulsed Laser Deposited HTSC Film"; SPIE, Vol. 1187, p. 204-215. (1989) ("Schultz")

The Rejection

Claims 19 and 29-34 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Behn alone or in view of Schultz.

1. *The Behn Reference*

Behn describes the production of electrical components which have alternate metal and polymer layers carried on a substrate. (Abstract). The electrical components are produced by fixing the substrates on a rotatable drum and rotating the drum through first and second vacuum chambers which are air-locked with respect to each other. (Abstract). In the first chamber the substrate is coated with a metal by a vapor deposition process, for example, by vaporizing a metal with an electron beam. (Col. 1, line 66 to col. 2, line 2 and col. 4, lines 31-34). A glow discharge polymer coating is applied in the second vacuum chamber. (Col. 4, lines 34-37). The air locks preferably have a port which allows for the evacuation of residual monomer gas and/or vaporized metal which respectively

diffuse through a narrow gap between the air locks and the vacuum chambers. (Col. 3, lines 65-68).

2. *The Schultz Reference*

According to Schultz, high quality, thin superconductor films can be produced by several techniques including electron beam co-deposition, sputtering, molecular beam epitaxy and laser deposition. (Schultz, p. 204). For many electronic applications, multilayer structures of superconducting and insulating layers are needed. To form such multilayer structures, Schultz describes the use of a target exchanger which provides three different rotating targets that can be selectively moved into the laser beam. (Schultz, p. 208).

Opinion

The examiner has rejected claims 19 and 29-34 as unpatentable under 35 U.S.C. § 103(a) over Behn alone or in view of Schultz. Behn is relied upon for its teaching of a chamber having multiple vacuum areas to create zones of higher and lower pressure for use in different deposition processes. (Examiner's Answer, p. 4). Behn is also relied upon for its description of substrates mounted on a rotating drum which passes through different zones, one of which is a lower pressure zone for vapor deposition of a metal onto the substrate. According to the examiner, the main difference between Behn and the claimed invention is Behn's generic teaching of vapor deposition and exemplification of an electron beam whereas appellant's claims recite the use of a laser beam to form an ablation plume of a

target material. (Examiner's Answer, pages 4-5). The examiner concludes, however, that laser beams and electron beams are conventional vapor deposition methods and that it would have been obvious to one skilled in the art to use a laser beam in Behn's process because of Behn's generic disclosure of a vapor deposition process and because analogous results would have been expected. (Examiner's Answer, p. 5). Alternatively, the examiner cites Schultz as teaching that electron beam evaporation and laser deposition are known alternative vapor deposition techniques. (Examiner's Answer, p. 5).

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art."). Furthermore, any motivation to modify the prior art references must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed Cir. 1995); *In re Gorman*, 933 F.2d 982, 986-87, 18 USPQ2d 1885, 1888-89, (Fed. Cir. 1991) ("When it is necessary to select elements of various teachings in order to form the claimed invention, we ascertain whether there is any suggestion or motivation in the prior art to make the selection made by the applicant. [Citations omitted] . . . The extent to which such suggestion must be explicit in, or may be fairly inferred from, the references, is decided on the facts of each case in the light of the prior art and its relationship to the applicant's invention.").

As stated above, appellant's claims are directed to a method for forming a thin film. The claimed method involves forming an ablation plume in a first container that extends into a second container to thereby deposit material from the plume onto a substrate. In contrast, Behn discloses a method where a *substrate* is transported from a vapor deposition chamber to a glow discharge chamber. Behn fails to describe, let alone mention, a method where the vapor deposition material is transported from a first chamber to a second chamber such that the deposition material is thereby deposited onto the substrate in the second chamber. Indeed, Behn arranges for the evacuation of residual vaporized metal such that the deposition metal does not extend into and deposit upon a substrate located in a second chamber. (Behn, col. 3, lines 53-68). Accordingly, while Behn transports a substrate from one container to another, Behn fails to suggest appellant's claimed transfer of a *deposition material* from one container to another.

Schultz, like Behn, fails to describe or suggest a method where a deposition material is transported from one container to another. Failing to describe the transfer of a deposition material from a first container to a second container, Behn, alone or in combination with Schultz, would not have rendered appellant's claimed invention obvious to one skilled in the art.

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Conclusion

The decision of the examiner to reject claims 19 and 29-34 as unpatentable under 35 U.S.C. § 103(a) over Behn alone or in view of Schultz is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED

EDWARD C. KIMLIN)
Administrative Patent Judge)
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)
) BOARD OF PATENT
THOMAS A. WALTZ)
Administrative Patent Judge) APPEALS AND
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) INTERFERENCES
)
MICHAEL P. TIERNEY)
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